National Aeronautics and Space Administration
Goddard Space Flight Center

Inside Wallops

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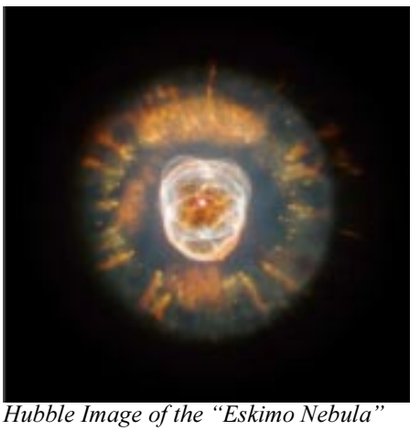
Hubble Reopens Eye on the Universe

NASA's Hubble Space Telescope is back in business, as made dramatically evident in stunning new celestial pictures taken Jan. 10 – 13, 2000 of remote galaxies and a colorful dying star.

The pictures are a culmination of the successful Space Shuttle servicing mission (STS-103) last December, which restored NASA's premier optical space observatory to full capability beefed-up with new electronics and critically needed replacement gyroscopes. Hubble has now resumed probing the Universe's many mysteries with a crystal-clear view.



Hubble Image of the "Eskimo Nebula"

"Thanks to the great work by the astronauts, Hubble is better than new," said Dr. Ed Weiler, NASA Associate Administrator for Space Science. "I think there is no better proof than these pictures that NASA's capability to send humans into space to work on Hubble has had a vital role in space science and the renaissance in astronomy we're now seeing."

"After a two-month hiatus, it is a tremendous boost to all of astronomy to see Hubble back in action. NASA has restored the observatory to a condition that was better than it was even before the fourth gyroscope failed," said Steven Beckwith, director of the Space Telescope Science Institute, the Hubble science operations center in Baltimore, MD.

To verify the telescope's refurbishment, astronomers resumed operations by aiming it at two scientifically intriguing celestial targets. One object is an intricate structure of shells and streamers of gas around a dying sun-like star 5,000 light-years away.

The "Eskimo Nebula", as seen through ground-based telescopes, resembles a face inside a furry parka. In Hubble's sharp view, the "furry" features resemble giant comets all pointing away from the central star.

"The clumps that form the comet heads all seem to be located at a similar distance from the star. This fact will be important in developing a theory of why the clumps formed in the first place," said planetary nebula expert J. Patrick Harrington of the University of Maryland, College Park, MD. He adds, "Of all the planetary nebulae imaged by the Hubble Space Telescope, this new image is unsurpassed in subtle beauty."

A second target is a massive cluster of galaxies, which acts like a giant zoom lens in space. The gravitational field of the cluster magnifies the light of more distant galaxies far behind it, providing a deep probe of the very distant universe. The cluster was imaged in full color, providing astronomers with a spectacular and unique new view of the early universe.

"For the first time we can view the internal color structure of some very distant galaxies. This gives us new insight into details of what young galaxies are like," says Richard Ellis at the California Institute of Technology, Pasadena, and University of Cambridge, England and a co-investigator on an earlier (black- and-white) Hubble image taken in 1994.

Spacecraft operators report that all the new equipment installed on the telescope in December is working perfectly, including the new computer, solid state recorder and fine guidance sensor. In particular the new gyroscopes are allowing Hubble to reliably point with exquisite precision at celestial objects.

Two key science instruments, the Wide Field and Planetary Camera 2 and the Space Telescope Imaging Spectrograph, are now being used for routine science observations by astronomers worldwide to probe everything from planets, to black holes, to far flung galaxies.

The Space Telescope Science Institute is operated by the Association of Universities for Research in Astronomy, Inc. for NASA, under contract with NASA's Goddard Space Flight Center.

The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency.

Black History Month

In 1915, noted scholar and historian, Dr. Carter G. Woodson, founded the Association for the Study of Negro Life and History. The Association was later renamed the Association for the Study of Afro-American Life and History (ASALH). A decade later, Woodson was still committed to increasing the awareness of the achievements of Blacks. Black History Week, which was observed during the second week of February to coincide with the birthday another important chamption of human rights, Frederick Douglass, was a result of Woodson's unwavering commitment.

As part of the nation's Bicentennial 1976, Black History Week was expanded to the entire month of February and is now celebrated all over North America.

NASA Goddard Space Flight Center has always sponsored programs and activities to help celebrate the historical awareness of African and African-American contributions, milestones and impacts on the world stage. The following presentations have been scheduled.

February 2, 2000 - 11:30 a.m., Bldg. 3 Auditorium
Brenda Simmons, SECME/South Eastern Conference of Minority Educators

February 9, 2000 - 11:30 a.m., Bldg. 3 Auditorium
Hank Wilfong, Small and Minority Business Chief Executive Officer

February 16, 2000 - 11:30 to 1:30 p.m., Bldg. 8 Auditorium
Duke Ellington School of the Arts in Washington, D.C.

February 22, 2000 - 8:15 a.m. to 9:30 a.m., Bldg. 8 Auditorium
Congressman Elijah Cummings

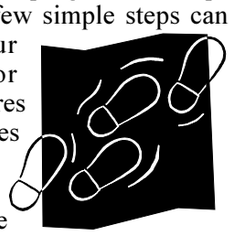
For information on activities scheduled at NASA Goddard Space Flight Center call Lisa Johnson, x1412 or call the EOPO at 66-7348.

Safety Message From the Administrator

Fault Tree Analysis

Several investigations are presently addressing the recent failures of the Mars Climate Orbiter and the Mars Polar Lander. We can improve the potential for success of NASA programs as we await the lessons these teams will report.

I would like to suggest some actions we need to take during the formulation phase of any new program development effort. A few simple steps can increase our chances for preventing failures in future launches and projects.



In our work, we tend to focus on ways to make things "go right." This confident optimism is an important characteristic that helps us pursue the challenges of invention and exploration. However, to make things "go right," we also need to understand and control the things that can "go wrong."

This beneficial pessimism is sometimes a bit more difficult to apply to our own creations, but is needed to increase the likelihood of future successes. I ask that we put more effort into analyzing "what can go wrong."

There are a number of engineering tools and techniques that can help us understand the vulnerabilities to our systems. These include the bottom-up analytical approach, known as the Failure Modes and Effects Analysis (FMEA), and the top-down approach, known as the Fault Tree Analysis.

At NASA, a Fault Tree Analysis is a methodical review of a system's hardware and software that begins by envisioning an undesired end state, such as mission failure or loss of crew or vehicle. The project team identifies, in a logical manner, the sequences and combinations of events that could lead to the undesired event. Fault Tree Analysis is most cost-effective when performed early in a project and updated as the project develops. When applied early in the life cycle, it is cheaper to modify a requirement or a drawing than it is to modify hardware or software code later on.

Fault Tree Analysis should also be used to evaluate possible system engineering changes that could eliminate or reduce potential failure paths. As one part of the three-pronged approach, it is a very effective way to find and graphically communicate to engineers and managers a design's potential"Achilles Heel," should one exist.

As we prepare for future missions, it is increasingly important that we apply tools such as the Fault Tree Analysis during the formulation and development of a project to ferret out design faults long before any mishap occurs. Think of it as a form of mishap investigation conducted BEFORE there is a mishap.

The complete text of this message and other health topics are available on the NASA web site (http://www.nasa.gov) as well as the Occupational Health web site (http://ohp.ksc.nasa.gov).

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From FEDWeek Jan. 26 Issue

Congress is returning to work this week with modest expectations of legislative progress this year, a prognosis that also applies to federal and postal employee and retiree issues. Demands of the political campaigning season plus a relatively short working period mean that the major emphasis will be on getting a budget passed while leaving many major initiatives to a new President and Congress next year.

Congress won't begin work in earnest until after Feb.7, when President Clinton submits his new budget proposal.

2001 Pay Raise Figure at Issue

One of the major action items for any session of Congress for federal employees is setting the pay raise for the following year—in this case the January 2001 increase.

Under the pay-setting formula, the across-the-board component would be 2.7 percent because of the law's provision to cut a half-percentage point from the employment cost index figure for the measuring period. Whether that figure will become as the across-the-board component and how much locality pay will be added on top of it, however, is up for grabs.

Congressional Calendar - Remember this is an election year.

Congress has scheduled vacations of about two weeks around Easter, Memorial Day and Independence Day. It plans to be in recess from late July through Labor Day and then adjourn for the year in the first week of October.

Your Support is Needed for Engineers Week

National Engineers Week is Feb. 20 to 26. Engineers, technicians and scientists who will speak to students at local schools about careers in science, technology and math are still needed. We currently have requests from 40 classes in 12 different schools.

A short information session is being planned for 9 a.m., Feb. 9 in the first floor conference room, Bldg. F-6. The session is to help potential speakers prepare and to demonstrate simple hands-on activities that can be used.

Exhibits, videos and other materials are available through the Visitor Center. National Engineers Week information packages are available in the Public Affairs Office and will be distributed at the Feb. 9 meeting. For additional information or to volunteer call Tony Goodyear, x1681 or Betty Flowers, x1584.

We need someone to visit:

Salisbury School
9th, 10th, 11th Grade Science Students

Mary N. Smith Middle School - 14 students
Parksley Middle School - 14 students
Central Middle School - 15 students
8th Grade Level Alegbra I Classes

Northampton Middle School
6th Grade - Math and Science Class - 23 students in four classes

Northampton Middle School
7th Grade - Math Class - 20 students in two classes

Arcadia/Badger Technical Center
11th and 12th Grade Computer Class - 18 students

Lighthouse Christian Academy
6th - 12th Grades - 35 Students

For Weather Delays

Call:
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(757) 824-2050

or listen to local radio and T.V. stations.

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